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Notice of Allowability	Application No.	Applicant(s)	
	10/509,628	UMEDA, AKIRA	
	Examiner	Art Unit	
	Nashmiya S. Fayyaz	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment of 6/1/07*.

2. ☒ The allowed claim(s) is/are *34-66*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20071027* .
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Soumya Panda on October 26, 2007.

The application has been amended as follows:

Claim 38 (Currently amended): A method for measuring dynamic linearity of an acceleration sensor, comprising:

generating an elastic wave pulse in a metal rod by impacting one of end surfaces of the metal rod with each of two round, concentrically located projectiles from a double launch tube independently, and by impacting both projectiles simultaneously or at a prescribed time interval;

using an acceleration sensor provided on the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

measuring strain in the elastic wave pulse produced by the impact of the projectiles with a plurality of strain gauges affixed axially along a side surface of the metal rod; and

calculating a correction to a strain gauge measurement signal corresponding to wave dispersion and attenuation according to elastic wave pulse propagation theory,

wherein the dynamic linearity of the acceleration sensor is obtained by comparing in time domain and frequency domain an output signal of the acceleration sensor, when two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from the calculated corrected signals obtained from the plurality of strain ~~gauge~~ gauges when two projectiles are launched separately.

Claim 39 (currently amended): A method for measuring dynamic linearity of an acceleration sensor, comprising:

generating an elastic wave pulse in a metal rod by impacting one of end surfaces of the metal rod with each of two round, concentrically located projectiles from a double launch tube independently, and by impacting both projectiles simultaneously or at a prescribed time interval;

using an acceleration sensor provided on the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

using an optical measuring instrument to measure the acceleration of the other end surface;

using at least one strain gauge provided on a side surface of the metal rod to measure strain in the elastic wave pulse produced by the projectile impact; and

calculating a correction to a strain gauge measurement signal corresponding to wave dispersion and attenuation according to elastic wave pulse propagation theory, using an output signal of the optical measuring instrument that measured the acceleration of the other end surface,

wherein the dynamic linearity of the acceleration sensor is obtained by comparing in time domain and frequency domain an output signal of the acceleration sensor, when two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from calculated corrected signals obtained from the at least one strain gauge when two projectiles are launched separately.

Claim 40 (currently amended): A method for measuring dynamic linearity of an acceleration sensor, comprising:

generating an elastic wave pulse in a metal rod by impacting one of end surfaces of the metal rod with each of two round, concentrically located projectiles from a double launch tube independently, and by impacting both projectiles simultaneously or at a prescribed time interval;

using an acceleration sensor provided on the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

using an optical measuring instrument to measure the acceleration of the other end surface;

measuring strain in the elastic wave pulse produced by the impact of the projectiles with a plurality of strain gauges affixed axially along a side surface of the metal rod; and

calculating a correction to a strain gauge measurement signal corresponding to wave dispersion and attenuation according to elastic wave

pulse propagation theory, using an output signal of the optical measuring instrument that measured the acceleration of the other end surface,

wherein the dynamic linearity of the acceleration sensor is obtained by comparing in time domain and frequency domain an output signal of the acceleration sensor, when two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from the calculated corrected signals obtained from the plurality of strain ~~gauge~~ gauges when two projectiles are launched separately.

Claim 44 (currently amended): An apparatus for measuring dynamic linearity of an acceleration sensor, comprising:

a launch apparatus configured to impact one of end surfaces of a metal rod with each of two round, concentrically located projectiles from a double launch tube independently and impact both projectiles simultaneously or at a prescribed time interval to generate an elastic wave pulse in the metal rod;

an acceleration sensor affixed to the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the

elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

an optical measuring instrument configured to measure a velocity of motion of the other end surface and ~~calculates~~ to calculate an acceleration value from the measured velocity; and

comparison means that compares in time domain and frequency domain an output signal of the acceleration sensor when two projectiles are impacted simultaneously or at a prescribed time interval with the acceleration obtained when two projectiles are launched separately, measured, and calculated by the optical measuring instrument.

Claim 46 (currently amended): An apparatus for measuring dynamic linearity of an acceleration sensor, comprising:

a launch apparatus configured to impact one of end surfaces of a metal rod with each of two round, concentrically located projectiles from a double launch tube independently and impact both projectiles simultaneously or at a prescribed time interval to generate an elastic wave pulse in the metal rod;

an acceleration sensor affixed to the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the

elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

a plurality of strain ~~array~~ arrays including one or more gauges affixed axially along a side surface of the metal rod that measures strain in the elastic wave pulse; and

comparison means that compares in time domain and frequency domain an output signal of the acceleration sensor, when the two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from strain measurement signals produced by the acceleration at a representative strain gauge location.

Claim 47 (currently amended): An apparatus for measuring dynamic linearity of an acceleration sensor, comprising:

a launch apparatus configured to impact one of end surfaces of the metal rod with each of two round, concentrically located projectiles from a double launch tube independently and impact both projectiles simultaneously or at a prescribed time interval to generate an elastic wave pulse in the metal rod;

an acceleration sensor affixed to the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the

elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

at least one strain gauge provided on a side surface of the metal rod to measure strain in the elastic wave pulse;

calculation means that calculates a correction to a strain gauge measurement signal corresponding to wave dispersion and attenuation according to elastic wave pulse propagation theory; and

comparison means that compares in time domain and frequency domain an output signal of the acceleration sensor, when the two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from ~~correction~~ the calculated corrected signals obtained from the at least one strain gauge when the two projectiles are launched separately.

Claim 48 (currently amended): An apparatus for measuring dynamic linearity of an acceleration sensor, comprising:

a launch apparatus configured to impact one of end surfaces of a metal rod with each of two round, concentrically located projectiles from a double launch

tube independently and impact both projectiles simultaneously or at a prescribed time interval to generate an elastic wave pulse in the metal rod;

an acceleration sensor affixed to the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

a plurality of strain gauges affixed axially along a side surface of the metal rod that measures strain in the elastic wave pulse;

calculation means that obtains a representative location measurement signal from a strain gauge measurement signal and calculates a correction to the representative location measurement signal corresponding to wave dispersion and attenuation according to elastic wave pulse propagation theory; and

comparison means that compares in time domain and frequency domain an output signal of the acceleration sensor, when the two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from ~~correction~~ the calculated corrected signals based on strain gauge measurement signals obtained when the two projectiles are launched separately.

Claim 49 (currently amended): An apparatus for measuring dynamic linearity of an acceleration sensor, comprising:

a launch apparatus configured to impact one of end surfaces of a metal rod with each of two round, concentrically located projectiles from a double launch tube independently and impact both projectiles simultaneously or at a prescribed time interval to generate an elastic wave pulse in the metal rod;

an acceleration sensor affixed to the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

a plurality of strain gauges affixed axially along a side surface of the metal rod for measuring strain in the elastic wave pulse;

an optical measuring instrument configured to measure a velocity of motion of the other end surface;

calculation means that calculates a correction to a strain gauge measurement signal corresponding to wave dispersion and attenuation according to elastic wave pulse propagation theory, based on an output signal of the optical measuring instrument; and

comparison means that compares in time domain and frequency domain an output signal of the acceleration sensor, when the two projectiles are impacted simultaneously or at a prescribed time interval, with a sum of acceleration signals obtained from ~~correction~~ the calculated corrected signals obtained from the plurality of strain ~~gauge~~ gauges when the two projectiles are launched separately.

Claim 50 (currently amended): The apparatus for measuring dynamic linearity of an acceleration sensor according to any one of claims 45 and 47, wherein the at least one strain gauge is composed of at least two strain gauges provided on a circumference of the metal rod at a same distance from the one end surface of the metal rod, and output signals from the ~~plurality of strain gauges~~ at least one strain gauge are used to measure strain in the elastic pulse.

Claim 52 (currently amended): An apparatus for measuring dynamic linearity of an acceleration sensor, comprising:

a launch apparatus configured to impact one of end surfaces of a metal rod with each of two round, concentrically located projectiles from a double launch

tube independently and impact both projectiles simultaneously or at a prescribed time interval to generate an elastic wave pulse in the metal rod;

an acceleration sensor affixed to the other of the end surfaces of the metal rod to measure an acceleration of the other end surface arising when the elastic wave pulse generated by the impact of the projectiles reflects at the other end surface;

a plurality of strain gauges affixed axially along a side surface of the metal rod that measures strain in the elastic wave pulse;

an optical measuring instrument configured to measure a velocity of motion of the other end surface;

calculation means that calculates a correction to a strain measurement signal produced by the acceleration at a representative strain gauge location corresponding to wave dispersion and attenuation according to elastic wave pulse propagation theory, based on an output signal of the optical measuring instrument; and

comparison means that compares in time domain and frequency domain an output signal of the acceleration sensor with a ~~correction~~ calculated corrected signal obtained from the plurality of strain ~~gauge~~ gauges.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nashmiya S. Fayyaz whose telephone number is 571-272-2192. The examiner can normally be reached on Mondays and Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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